remain uncorrected. It will be seen in that figure that the eye, and particularly the front convex surface of the crystalline lens, makes the rays diverge, instead, of course, of making those that catch the watery prism converge a little less.

J. F. BLAKE

Antedated Books

I AM sorry to have to trouble you again under this heading, but Mr. Sharpe's second letter necessitates a short reply. I did not accuse Mr. Sharpe, in my original letter, of having *wilfully* misdated his book, I never even mentioned his name. I merely stated the facts and added a few comments to show that the date *was* a matter of some importance. Mr. Sharpe is now angry because I do not withdraw a charge which I never made. If he had simply explained in his first letter that the misdate was an error of his publisher and promised that it would not occur again, the matter would have been ended. When he proceeded to attack me for doing what I believed to be my duty, he naturally provoked an unpleasant answer. F. Z. S.

OUR ASTRONOMICAL COLUMN

VARIABLE STARS (1), Mira Ceti.—Herr Julius Schmidt, Director of the Observatory at Athens, by a mean of three sets of comparisons with δ and γ Ceti and α Piscium, fixes the first maximum of 1876 to February 3·7, the date inferred from Argelander's formula of sines being January 17·0. The minimum by the same formula occurred on September 1.

(2) R Hydræ. Of this object, so difficult to observe satisfactorily in these latitudes, Herr Schmidt observed a maximum 1876, April 12·5.

(3) The same observer refers to a secondary minimum of the well-known variable star R Leonis, discovered by Koch in 1782. For the present year his observations have given the principal maximum May 7·7, the secondary minimum May 21·7, a maximum June 1·7.

(4) 16 Eridani. There appear to be grounds for adding this star to the list of variables. It was considered as high as 3·4 by Piazzi, 4·3 by Heis, 4 by Flamsteed, and in the Washington general catalogue it is 4·4. Brisbane calls it 6, Argelander, once 5, and once 6. Smyth says, "it appeared more than once diminished to nearly a fifth magnitude."—This star is also τ^4 Eridani of B.A.C., but as Bayer's map has no fewer than nine stars to which this letter is applied, it appears preferable to adopt Flamsteed's number.

(5) We learn from Dr. Gould, that the variable star in Musca, to which he has already directed attention, has certainly a period shorter than that of any other known variable star—or about thirty hours only. Its variation is such that at minimum it is fairly beyond unassisted vision in the sky of Cordoba, though distinctly seen at maximum.

(6) In a short list of variable stars stated by Dr. C. H. F. Peters, of Hamilton College, Clinton, U.S., to have been recently detected, which appears in *Comptes Rendus*, 1876, August 28, and in M. Leverrier's *Bulletin International*, of Sept. 6, is one in R.A. (1860), 15h. 13m. 21s., N.P.D. 109° 53′, said to vary between the sixth and eleventh magnitudes. This star, however, is not new; it is No. 76 of Schönfeld's last catalogue, and was discovered by M. Borelley in 1872. Schönfeld's limits are 8·0 and 12·5, the latter doubtful, and he assigns, as a rough approximation to elements:

Maximum . . . 1874, June 17 + 193^d E.

The first star on the same list is No. 6 of Schönfeld's list in the introduction to his second catalogue (S. Libræ).

AN INTRA-MERCURIAL PLANET (?).—The account of the observation of a round spot on the sun's disc, remarked on April 4, but not seen either on the preceding or following morning, which was quoted last week, from *L'Institut* of August 30, appears not to have been there given accurately. By the *Comptes Rendus* of August 28, we learn that M. Leverrier made the statement on the authority of a letter from Prof. Rudolph Wolf, Director of the Observatory at Zurich, dated August 26. Prof. Wolf says:—"It will doubtless interest you to learn that M. Weber, at Peckeloh, saw on the 4th of April last, at 4h. 25m. M.T. at Berlin, a round spot upon the sun, which was seen without spot on the same morning and on the following one, not only by M. Weber, but also by me and by M. Schmidt at Athens. (For the observation of M. Weber, see No. 34 of the *Wochenschrift für Astronomie*.) I remark that the date of M. Weber's observation follows that of M. Lescarbault by

$$6219 \text{ days} = 148 \times 42^d{\cdot}02,$$

which is curious enough on comparison with what I have published on the subject at the time. See my 'Handbuch der Mathematik und Astronomie,' vol. ii., p. 327."

So that instead of the spot having been noticed in three different and distant places, it was remarked at Peckeloh, near Münster only, though the observations by Prof. Wolf, at Zurich, and Herr Julius Schmidt, at Athens, establish the fact of the sun having been without the spot in question shortly before and after its observation by Herr Weber, who is well known by his observations on the zodiacal light and other phenomena.

At present the particulars of the observation are not to hand, but it is singular that Prof. Wolf's period of 42·02 days not only accords with the observation of M. Lescarbault, so far as regards an inferior conjunction of the body with the sun on March 26, 1859, but it also agrees with that of Mr. Lummis, March 20, 1862, and with the one recorded by Decuppis at the Collegio Romano, on October 2, 1839, at the opposite node, at least within probable transit-limits. Particulars of Mr. Lummis's observation will be found in vol. xxii. of the *Monthly Notices* of the Royal Astronomical Society; that of Decuppis was thus mentioned at the sitting of the Paris Academy of Sciences, 1839, December 16:—"M. Decuppis announces that on October 2, continuing the observations which he had been making upon the spots on the sun, he saw a black spot, perfectly round, and with border sharply defined, which advanced upon the disc, with a rapid proper motion, such that it would have traversed the diameter in about six hours. M. Decuppis thinks that the appearances which he has observed can only be explained by admitting the existence of a new planet."

If we were to accept the particulars of the various observations of a similar character as they are recorded, it would be impossible to refer them to a single body, no matter what the excentricity of the orbit might be assumed to be, but most unfortunately these observations have on no one occasion so far been taken by a practised astronomer with proper micrometrical assistance. On the contrary, they have mostly fallen to the lot of occasional observers, who have contented themselves with eye-estimations of position on the sun's disc, from which little can be definitely ascertained.

The Peckeloh observation of April 4 naturally suggests frequent observation of the sun's disc from the middle of the present month to the middle of October, particularly about October 10.

[Since the above was in type, we learn from a Paris correspondent that M. Leverrier has made a further communication to the Academy on the subject of an intra-Mercurial planet or planets. Instead of a period of forty-two days, as suggested by Prof. Wolf, he thinks one of twenty-eight days more probable; and this, it may be observed, is an aliquot part of Prof. Wolf's period. But notwithstanding a period of twenty-eight days accords with a number of the observations referring to round black spots upon the solar disk, M. Leverrier is stated to

have expressed an opinion in favour of the existence of two planets at nearly the same mean distance. With respect to a period of twenty-eight days, we remark that reckoning from 1876, April 4, it will agree with the observations of Lescarbault and Lummis, but not with that of Decuppis; while it also agrees with the observation of Stark, 1819, October 9, a very definite one, which is not brought in with a period of forty-two days. The shorter period will be found to correspond with a mean distance of 0·18.]

SCIENCE IN SCHOOLS

THE accompanying letter, signed by several men of Science and Head-masters, has been sent to the General Committee of the British Association :—

DEAR SIR,—It is hoped that a Committee may be formed at this year's meeting of the British Association for the promotion of Science Teaching in Schools. Its proposed functions would be—

1. To communicate with head-masters and governing bodies as to carrying out the recommendations contained in Report VI. of the Science Commission, and to offer advice, if required, on all necessary details of selection, arrangement, and outlay.

2. To press upon the Universities such steps in connection with the pending Bill in Parliament as may beneficially influence school teaching of science.

3. To watch the action of Government in any proposal made by them either in pursuance of Lord Salisbury's Bill or in giving effect to the Duke of Devonshire's Commission, and to hold a brief for science-teaching at schools in reference to all such legislation.

We desire to bespeak your attention to and interest in this proposal, which appears to us in all respects a timely one.

THE BRITISH ASSOCIATION

GLASGOW, *Tuesday*

THE Association finds a fitting home in Glasgow, which has few rivals either in earlier or later scientific reputation. The force of long-continued scientific traditions, added to the present encouragement given to science, and I must also say, to the nearness of the finest holiday localities, makes this one of the most brilliant of recent meetings. Not only is the total number of members and associates attending very high, over 2,700, but the true chiefs of science are present in great strength. It cannot be said that the Association itself is this year at all below its high aims. The majority of papers are really scientific, and do not emasculate the truth in the effort to popularise it. Discussions have been very interesting, judging from the perseverance with which they have been listened to. The reception given by the people of Glasgow is worthy of the city, although it is possible that in the details and refinements of arrangement, Bristol excelled. This was especially manifested in regard to some of the excursions. But it is evident that the very best efforts of the north have been put forth in every way, and the general result is undeniably successful. The charming situation of the University Buildings, in which all the sections but one hold their meetings, is a very great advantage.

From the Report of the Council it will be seen that grants in aid of scientific objects have been made during the year to the amount of 1,092*l*. The income of the year has reached 3,743*l*., and the cash balance, 764*l*., exceeded that of last year by 624*l*.

The President's Address did not excite general enthusiasm among the audience, partly because the great size of the building and the comparative weakness of the speaker's voice prevented many from hearing well, partly, also, because it was such as to impress most those who think most. The address manifested the combination in its author of qualities seldom marching together; deep regard for elder times and their achievements, wide knowledge of the position of science at the present day, perception of the true relationships, the real connexus of pure and applied science, a realisation, founded on careful study of the way in which the scientific cultus affects human nature, and the rise and fall of nations. It would be vain to seek for scientific arrogance and conceit in Dr. Andrews's deliverance, and if one may forecast, it may be expected to have as much influence on future thought and public action as almost any recent utterance from the presidential chair of the British Association, without any tendency to provoke the hostility of the unscientific.

Among the presidential addresses, that of Mr. Wallace to the Biological Section seems to have attracted much notice; and there is no doubt of its great value, for, scarcely occupying any ground covered by his recent great work on "The Geographical Distribution of Animals," he may be said to have laid the foundations of a new science out of "waste materials" already existing. Thus another group of scattered fragments is beginning to be sought by right processes, in order that a coherent edifice may be erected. Sir William Thomson returned again to the charge against the exorbitant demands of geologists for "time." If he is right, of course some geological theories must be altered; but perhaps Sir William will not have to wait long for an answer. It was singular that Prof. Young, in the Geological Section, should have chosen a subject agreeing so largely with Sir William Thomson's. His views, carried out into more geological detail, imply that we are to look for a general reconstruction of much that is held to be settled in geological theory. He calls loudly for precision in geological phraseology, believing that there is nothing more urgently needed to secure progress in the science than some of that accuracy of conception and expression which distinguishes mathematical and physical science. Capt. Evans's address on Geography will perhaps disappoint some who think the questions of oceanic circulation are practically settled, but an open confession of difficulties and ignorance is better than any false security. Such confessions have been very general among the best men at this meeting—a favourable augury of coming victories for science.

On the whole the sections have done hard work, and comparatively little sacrifice of scientific rigour and form has been made for the sake of making subjects popular. The Duke of Argyll's address on the Geology of the Highlands was a *bonne bouche* for the untechnical, and was much run after. The Duke has shared "lionship" with Commander Cameron and Sir C. Wyville Thomson; consequently the heart of Africa and the depths of the sea are among the favourite subjects here. Sir William Thomson has, of course, been at home on the great Tide question, denouncing the British Hydrographic Department for its supineness, by which very laborious and expensive efforts are left to private individuals. One of the most lively encounters has concerned the junction of the granites and Old Red Sandstone in Arran. It was suggested that Mr. Wünsch and Dr. Bryce should adjourn to the locality to fight it out, but without hammers. The chemists had a field-day on the disposal of the sewage of towns. Irrigationists and precipitationists continued their controversies, giving excuse to great towns still to postpone dealing with the subject. While the doctors, or rather chemists, differ, the sewage is emptied into the river.

Prof. Tait's discourse on Force was very characteristic. One important advantage gained by the audience would probably be an impression of the necessity of accuracy in the use of words.

Sir C. Wyville Thomson's address on the Results of